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No. 14 Spiral Bevel and Hypoid Gear Grinder

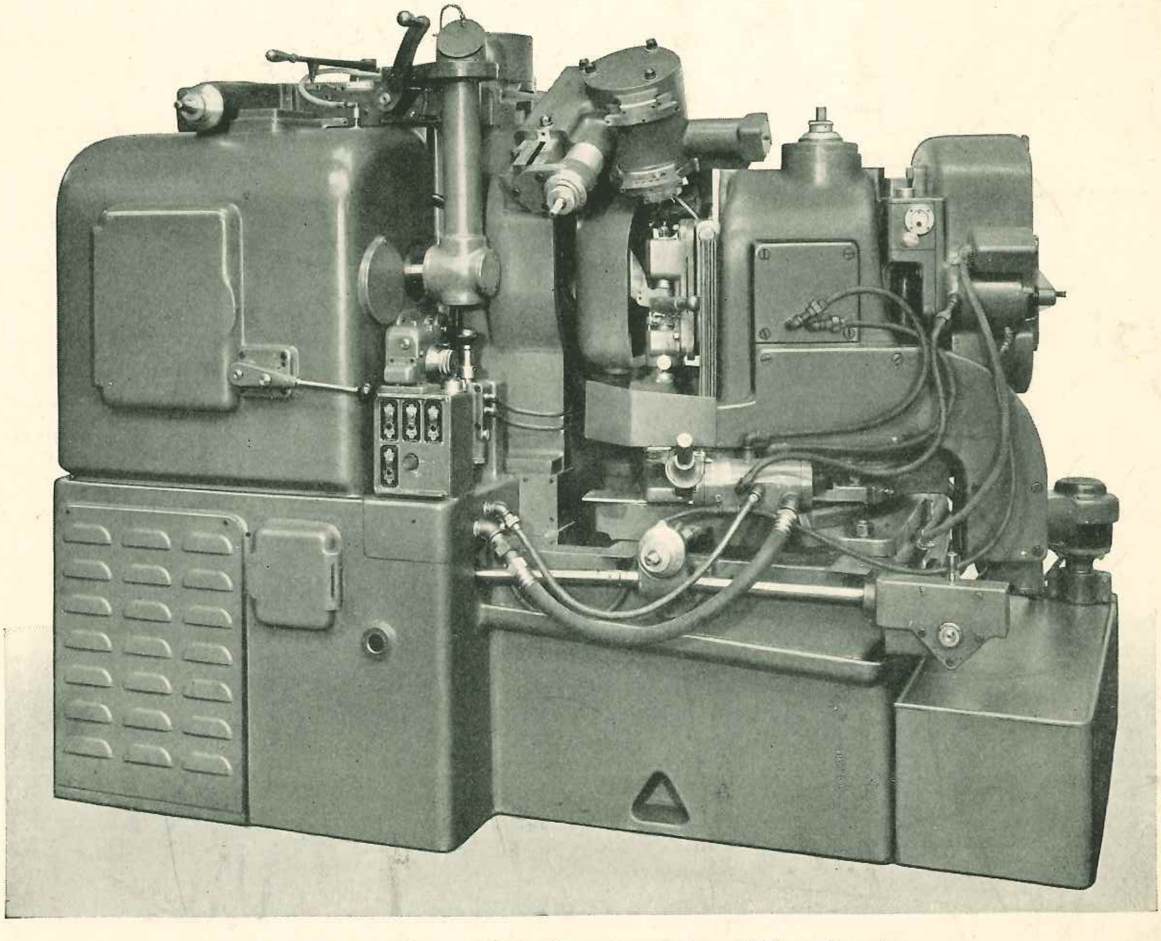
Code Word "CHEER"

GLEASON WORKS

1000 UNIVERSITY AVENUE
Rochester, N. Y., U. S. A.

THIS completely new machine overcomes the difficulties encountered in the deformation which occurs in heat-treating Spiral Bevel and Hypoid Gears. It permits the teeth of any gear within its capacity to be finish ground to the closest possible limits.

The tooth surfaces are ground with a flaring cup wheel. The use of this type of wheel has advanced the art of grinding the teeth of Spiral Bevel and Hypoid Gears to the point where it is now possible to grind them faster than it is possible to finish cut them. This wheel is carried from end to end of the teeth by an oscillating motion to grind the full length. With a wheel of this type, the area of contact is limited so that stock can be removed rapidly without danger of burning. Both sides of a tooth space are ground simultaneously.



Front View of No. 14 Spiral Bevel and Hypoid Gear Grinder

In the grinding operation the wheel is fed into the gear until the full depth position is reached then the wheel is withdrawn and the gear indexed. Alternate grinding and indexing proceeds until all the teeth have been ground. Then the machine is stopped automatically.

Wheel Mechanism

The wheel spindle is mounted on preloaded anti-friction bearings, and is driven from a motor in the base of the machine by a combination V-belt and spiral bevel gear drive.

Wheel Housing

The housing which supports the wheel spindle oscillating and dressing mechanisms is cast in one piece and bolted directly to the frame. The working mechanism is completely enclosed, but is readily accessible for setting up or inspection.

Wheel Dressing Mechanism

The wheels are dressed by a dresser containing three diamonds. Both sides and the point of the wheel are dressed simultaneously by these diamonds, which are actuated by the movement of a single piston hydraulically operated. A conveniently located jogger valve, which is graduated to permit selection and change in speed of diamond travel, controls the mechanism. The advanced positions of the dresser diamonds, which are accurately set at the start by a dial type of indicator, result in the dresser being a gage. After adjustments have been made to compensate for wheel wear the wheel adjusting unit is hydraulically clamped on all four corners in grinding position.

Controls of the Machine

The chucking and dechucking of the work is controlled from a single hand operated valve. The machine is so arranged that it is not necessary to move the work head back to remove finished gear or to reload. Provision has been made to move the work head back to facilitate changing wheels, gaging the diamonds and changing arbor. When this is done the ways are automatically flushed with oil.

The movement of the roughing and finishing cams into and out of operating positions is controlled by a single lever operating through a pinion and rack.

This machine is automatically stopped after the last tooth space has been ground. A light indicates to the operator that the machine is at the proper point in its cycle for dressing the wheel. The wheel spindle is swung up into dressing position by moving a control lever.

Work Head

A spring type of chucking mechanism is built into the spindle. The taper work holding end of the spindle is hardened and ground. It is held in place by two capped bearings and provisions made to take up end thrust. The work spindle carrying unit is adjustable vertically on a column. The work head is adjustable longitudinally and radially.

A compact and rigid stock dividing gage unit is mounted on the front end of the work head. Before the gear is clamped, it is accurately positioned with this stock dividing gage to permit removal of equal stock on both sides of the tooth space.

Index Mechanism

The motions necessary to operate the index mechanism are accomplished mechanically from a cam which is part of the feed unit. A hardened and ground index plate, which has the same number of notches as there are teeth in the gear being ground, accurately positions the spindle. This plate is mounted directly on the spindle. The entire indexing unit is located on the rear of the work head.

Frame

The frame is of one-piece construction offering a stable foundation to all units comprising the complete machine. A spacious tank is provided for the grinding coolant which is easily removed for cleaning. A single hydraulic supply unit is built into the machine to furnish power to all the necessary hydraulic functions.

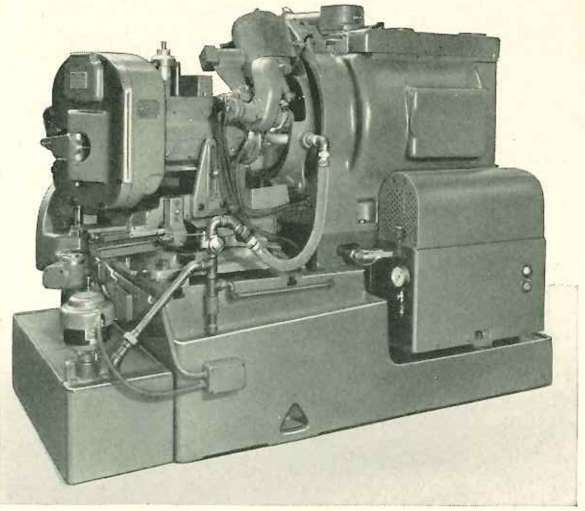
Change Gears

Conveniently located change gears permit changing the time per tooth and the number of strokes of the grinding wheel per minute. These gears are hardened and constantly supplied with lubrication.

Lubrication

Lubrication for the most part is automatic. A built-in pump supplies the entire feed unit, wheel spindle, and all auxiliary parts concealed in the housing with a measured amount of oil.

Two plunger pumps furnish lubricant to the wheel carrying cross slide, work spindle, work head, and the entire index mechanism.



Rear View No. 14 Spiral Bevel and Hypoid Gear Grinder

There are a few hand oilers and grease fittings for parts requiring infrequent lubrication.

Standard Equipment

The following is furnished as standard equipment with the machine:

Two Grinding Wheels and Two Adapters with Balancing Rings

Diamond Setting Gages (Diamonds are not furnished)

One Index Plate

Proof Gage for checking dressing mechanism

Speed and Feed Change Gears

Grinding Wheel Mounting Spindle

Balancing Arbor

Necessary Wrenches

For Machine Specifications See Page 4

Specifications

Capacity

Longest cone distance (30° Spiral Angle)	8″
Largest Pitch Angle, Shafts at 90°	84° 18′
Smallest Pitch Angle, Shafts at 90°	71° 34′
Extreme ratio, Shafts at 90°	10 to 1
Smallest ratio, Shafts at 90°	3 to 1
Largest Pitch Diameter, 10 to 1 ratio gear	16″
3 to 1 ratio gear	15¼″
Largest Pitch, Gleason System	2 D.P.
Longest Face	2″
Spiral Angle (Right-Hand Gear Only)	10° to 45°
No. of Teeth—(Index Range)	30 to 78

Work Spindle

Diameter of taper hole, large end	2 19/64″
Taper per foot	½″
Depth of taper	6″

Work Head Settings

Setting Axial, Nose of Spindle to Machine Center . . . . 4″ to 6″

Feeds

Feed, Seconds per tooth . . . . 2.1 to 8.2

Grinding Wheel

Diameters (Corresponding to Spiral Cutter Diameters) . . . . 7″ to 10″

Drive

Wheel Motor—5 H.P.—1800 R.P.M.—N.E.M.A. Std.
Feed Motor—2 H.P.—1200 R.P.M.—N.E.M.A Std. Vertical.
Hydraulic Motor—1 H.P.—1200 R.P.M.—N.E.M.A. Std.
Coolant Pump—¼ H.P.

Miscellaneous

Floor Space—95″ x 56″
Net Weight (lbs.) 12,000
Domestic Shipment (lbs.) 13,100
Foreign Shipment (lbs.) 13,500 (112″ x 74″ x 80″)

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